

IN THE CLAIMS

Claim 1 (original): A semiconductor device comprising:
an integrated circuit chip having an active and a passive surface, said active surface
including a protective polymer layer having been preactivated to impart adhesiveness, and at least one bonding pad;
an electrically insulating substrate having first and second surfaces;
a plurality of electrically conductive routing strips integral with said substrate;
a plurality of contact pads disposed on said first surface of said substrate, at least one of said contact pads electrically connected with at least one of said routing strips;
said second surface of said substrate being directly attached to said preactivated polymer layer; and
bonding wires electrically connecting said at least one bonding pad to at least one of said contact pads.

Claim 2 (original): The semiconductor device according to Claim 1 wherein said polymer layer is a polyimide layer.

Claim 3 (currently amended): A semiconductor device comprising:
an integrated circuit chip having an active and a passive surface, said active surface
including a protective polymer layer having been preactivated to impart adhesiveness, and at least one bonding pad;
an electrically insulating substrate having first and second surfaces;
a plurality of electrically conductive routing strips integral with said substrate;
a plurality of contact pads disposed on said first surface of said substrate, at least one of said contact pads electrically connected with at least one of said routing strips;

said second surface of said substrate being directly attached to said preactivated polymer layer; and

bonding wires electrically connecting said at least one bonding pad to at least one of said contact pads.

~~The semiconductor device according to Claim 1 wherein said preactivation comprises plasma exposure of said polymer layer for increasing the surface roughness and creating molecular radicals comprising chemically unsaturated bonds.~~

Claim 4 (original): The semiconductor device according to Claim 1 wherein said substrate is made of organic material and is selected from a group consisting of FR-4, FR-5 and BT resin.

Claim 5 (original): The semiconductor device according to Claim 1 wherein a metal layer is disposed on said second surface of said substrate prior to attaching said second surface to said preactivated polymer layer on said chip.

Claim 6 (original): The semiconductor device according to Claim 5 wherein said metal layer is selected from a group consisting of copper, copper alloy, iron-nickel alloy, invar and gold.

Claim 7 (original): The semiconductor device according to Claim 1 wherein said at least one bonding pad is disposed at the periphery of said chip.

Claim 8 (original): The semiconductor device according to Claim 7 wherein said contact pads are disposed around the periphery of said substrate.

Claim 9 (original): The semiconductor device according to Claim 1 wherein said at least one bonding pad is disposed at the centerline of said chip.

Claim 10 (original): The semiconductor device according to Claim 9 wherein said substrate has an opening and said contact pads are disposed along said opening.

Claim 11 (original): The semiconductor device according to Claim 1 wherein said encapsulating material covers said bonding wires, said at least one bonding pad and said contact pads.

Claim 12 (original): The semiconductor device according to Claim 1 wherein said first surface of said substrate further comprises a plurality of assembly pads, at least one of said assembly pads electrically connected with at least one of said routing strips.

Claim 13 (original): The semiconductor device according to Claim 12 further including at least one solder ball located on at least one of said assembly pads disposed on said first surface.

Claim 14 (original): The semiconductor device according to Claim 1 wherein said chip and said substrate have substantially the same outlines.

Claim 15 (original): The semiconductor device according to Claim 1 wherein said integrated circuit chip comprises silicon, silicon germanium, gallium arsenide or any other semiconductor material used in electronic device production.

Claims 16-32 (cancelled)